Reconsideration of the rejections set forth in the Official Action dated October 24, 2001 and entry of the present amendment are respectfully requested. The Examiner has rejected claims 8-133. Applicants have canceled claims 121, 123-127 and 129133 without prejudice, added new claim 134, and amended claims 8, 9, 13, 19, 22, 26, 27, 31, 33, 38, 44, 46, 51, 57, 59, 65, 71, 73, 78, 84, 86, 91, 97, 99, 112, 115, 120, 122 and 128. Accordingly, claims 8-120, 122, 128 and 134 are pending in the subject application.

A. Response to the Examiner's Objections of the Specification

The Examiner requests that Applicants fully identify the prior art references referred to on page 2, lines 4 and 18 of the Specification ("Marsmann et al. and Brown et al."). In response, the Specification has been amended to recite a full citation of each of the above references.

The Examiner also objected the alleged inclusion of figures in the Specification. Specifically, the Examiner requests that the Applicants submit the alleged "flow diagrams" (e.g., "Figures 2-9") as drawings. As explained to the Examiner by the undersigned during a telephone interview on January 28, 2002, the alleged "flow diagrams" are chemical reaction schemes and, as such, can be included in the Specification section of the Application. The Examiner subsequently telephoned the undersigned on January 30, 2002 confirming that said chemical reaction schemes can be included in the Specification section of the Application. The Applicants have removed all references to a "Figure" and have inserted "Scheme" therefor. Accordingly, Applicants respectfully submit that the objections have been obviated.

B. Response to the Double Patenting Rejections

The Examiner alleges that claims 125, 127, 129, 131, and 133 are substantial duplicates of claim 121; that claims 121, 125, 127, 129, 131 and 133 recite the same compound; and that claims 123, 124, 126, 128, 130 and 132 are substantial duplicates of claim 120. Without acquiescence in the Examiner's allegations, Applicants have canceled claims 121, 123-127 and 129-133 without prejudice. In addition, Applicants have amended claim 128 to recite only a compound "having the formula $[RSiO_{1.5})_m(RXSiO_{1.0})_n]$", which is not recited in claim 120. Therefore, Applicants respectfully submit that the Double Patenting rejections have been traversed.

C. Response to the Examiner's Claim Objections

The Examiner objects to claims 8-21, 29, 33-133 as having certain typographical errors. Applicants have corrected these typographical errors and, thus, respectfully submit that these objections have been obviated.

D. Response to the Examiner's Rejections Under 35 U.S.C. § 112

The Examiner has rejected claims 8-133 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention.

Turning first to the Examiner's allegation that claims 8, 22, 23, 46, 59 and 73 are incomplete for omitting essential structural cooperative relationships of elements, Applicants have explained to the Examiner during several telephone interviews, the most recent of which was on March 14, 2002, and the Examiner has agreed, that the above claims are complete with all essential structural cooperative relationships of elements. Specifically, Applicants explained to the Examiner, and the Examiner agreed, that the X group in the resulting compound comes from the base recited in the claims, and the R' group comes from the R group in the starting material. For claim 46, it is clearly recited that the resulting POSS fragments are expanded POSS fragments, which are different from the starting POSS fragments. For clarity purposes, claim 59 has been amended to state that the second functionalized POSS nanostructure compound is different than the first functionalized POSS nanostructure compound. Similarly, claim 73 has been amended to include the formula for the POSS fragment for clarity (the term "POSS fragment" is clearly defined and supported in the Specification). In addition, the Examiner has inquired about the difference between the first and second POSS nanostructure compounds in claim 73. Again, Applicants explained to the Examiner, and Examiner agreed, that claim 73 recites that the "second POSS nanostructure compound ha[s] a number of silicon Si atoms equal to the combined number of silicon atoms present in the POSS fragment and in the first POSS nanostructure compound," which clearly sets forth the difference between the first and second POSS nanostructure compound.

The Examiner also rejects claims 8, 22, 33, 46, 59, 73, 86, 99, 120, 122124, 126, 128 and 130 because the term "the composition" lacks antecedent basis. Without acquiescence therein, Applicants replaced the term "composition" with --formula--, which does have antecedent basis in these claims.

Applicants have amended claim 9 so that it now depends on claim 8, as suggested by the Examiner.

In addition, claims 13, 27, 38, 51, 65, 78, 91 and 106 have been amended to delete the word "exhaustive" in order to more particularly and distinctly set forth the patentable subject matter of the present invention.

For claims 57, 71, 84, 97 and 112, the Examiner asserts that there is a lack of antecedent basis for the term "polymeric silsesquioxanes". In response, Applicants have corrected this typographical error by amending each of the 5 claims re recite the correct compound. For example, claim 57 has been amended to replace the term "polymeric silsesquioxanes" with --plurality of POSS fragments--, and claim 71 has been amended to delete the term "polymeric silsesquioxanes" and replace it with --first functionalized POSS nanostructure compound--.

Similarly, Applicants have corrected the typographical error in claim 115 by amending the claim to replace "108" with --R--.

Accordingly, Applicants respectfully submit that the Examiner's rejections under 35 U.S.C. § 112 have been traversed.

E. Response to the Examiner's Rejections Under 35 U.S.C. § 102

The Examiner has rejected claims 120-133 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,484,867 (hereinafter "the '867 Patent"). Specifically, the Examiner asserts that the '867 Patent teaches in column 5, lines 35-65, a polyhedral oligomeric silsesquioxane of the formula $[(RSiO_{1.5})_4(RXSiO_{1.0})_3]$ $\sum 7$. Without acquiescence therein, Applicants have deleted claims 121, 123-127 and 129-133, and have amended claims 120, 122 and 128 such that the amended claims do not recite $[(RSiO_{1.5})_4(RXSiO_{1.0})_3]$ $\sum 7$.

Claims 8, 22, 33, 46, 59, 73, 86, 99, 120, 122 and 128 have been amended to replace the phrase "X represents an inorganic substituent" with "X represents a functionality substituent." As indicated on page 3, lines 13-15 of the Specification, X can be an organic substituent and, thus, the original claim language is not entirely accurate. Support for the amended language can be found, for example, on page 7, line 9, and page 3, lines 13-15.

Furthermore, new claim 134 has been added to more particularly and distinctly set forth the patentable subject matter of the present invention. Support for claim 134 can be found, for example, on page 15, lines 11-12. No new matter has been added.

As it is believed that all of the Examiner's objections and rejections have been overcome, it is respectfully requested that the application be allowed to issue.

If the Examiner has any questions regarding the foregoing, or if the Examiner believes that an interview would facilitate the examination of this application, or if any additional information is required, the Examiner is invited to contact the undersigned at (415) 983-1280.

Respectfully submitted,
PILLSBURY WINTHROP L.L.P.

Dated: March 21, 2002

By: _____
Karry W. Wang
Reg. No. 50-178

Attorneys for Applicant(s)
50 Fremont Street
P.O. Box 7880
San Francisco, CA 94120-7880
Phone: 415/983-1280
Fax: 415/983-1200

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APPENDIX
VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

The specification is changed as follows (text which has been struck through has been deleted and underlined text _____ has been added):

8. (Amended) A process of converting a polymeric silsesquioxane into a POSS nanostructure compound, comprising:

mixing an effective amount of a base with the polymeric silsesquioxane in a solvent to produce a basic reaction mixture, the base reacting with the polymeric silsesquioxane to produce the POSS nanostructure compound,

wherein the polymeric silsesquioxane has the formula $[RSiO_{1.5}]_{\infty}$, and the POSS nanostructure compound is selected from the group consisting of homoleptic nanostructure compounds having the formula $[(R\text{~~X~~}SiO_{1.5})_n]_{\sum\#}$, heteroleptic nanostructure compounds having the formula $[(RSiO_{1.5})_m(R'SiO_{1.5})_n]_{\sum\#}$, functionalized homoleptic nanostructure compounds having the formula $[(RSiO_{1.5})_m(RXSiO_{1.0})_n]_{\sum\#}$, and functionalized heteroleptic nanostructure compounds having the formula $[(RSiO_{1.5})_m(R'SiO_{1.5})_n(RXSiO_{1.0})_p]_{\sum\#}$, where R and R' each represents an organic substituent, X represents ~~an inorganic~~ functionality substituent, ∞ represents the degree of polymerization and is a number greater than or equal to 1, m, n and p represent the stoichiometry of the ~~composition~~formula, $\sum$ indicates nanostructure, and # represents the number of silicon atoms contained within the nanostructure.

9. (Amended) The process of claim ~~1~~8, wherein the base and the polymeric silsesquioxane are mixed by stirring the reaction mixture.

13. (Amended) The process of claim 12, further comprising the step of purifying the isolated POSS nanostructure compound through ~~exhaustive~~washing with water.

19. (Amended) The process of claim 8, further ~~comprises~~comprising mixing a co-reagent with the base and the polymeric silsesquioxane in the solvent.

22. (Amended) A process of converting a polymeric silsesquioxane into a POSS fragment, comprising:

mixing an effective amount of a base with the polymeric silsesquioxane in a solvent to produce a basic reaction mixture, the base reacting with the polymeric silsesquioxane to produce the POSS fragment,

wherein the polymeric silsesquioxane has the formula $[RSiO_{1.5}]_{\infty}$, and the POSS fragment has the formula $[(RSiO_{1.5})_m(RXSiO_{1.0})_n]$, where R represents an organic substituent, X represents ~~an inorganic~~ functionality substituent, ∞ represents the degree of polymerization and is a number greater than or equal to 1, and m and n represent the stoichiometry of the ~~composition~~formula

26. (Amended) The process of claim 25, wherein the POSS fragment is isolated by distillation, filtration, evaporation, decantation, crystallization, pressure reduction, or extraction, or a combination thereof.

27. (Amended) The process of claim 26, further comprising the step of purifying the isolated POSS fragment through ~~exhaustive~~ washing with water.

31. (Amended) The process of claim 22, further ~~comprises~~comprising mixing a co-reagent with the base and the polymeric silsesquioxane in the solvent.

33. (Amended) A process of converting a mixture of different homoleptic POSS nanostructure compounds into a heteroleptic POSS nanostructure compound, comprising:

mixing an effective amount of a base with the mixture of different homoleptic POSS nanostructure compounds in a solvent to produce a basic reaction mixture, the base reacting with the mixture of different homoleptic POSS nanostructure compounds to produce the ~~(desired)~~ heterolepic POSS nanostructure compound,

wherein the homoleptic POSS nanostructure compounds have the general formula $[(R\text{-}XSiO_{1.5})_n]_{\sum\#}$, and the heteroleptic POSS nanostructure compound is selected from the group consisting of a nonfunctionalized heteroleptic nanostructure compound having the formula $[(RSiO_{1.5})_m(R'SiO_{1.5})_n]_{\sum\#}$ and a functionalized heteroleptic nanostructure compound having the formula $[(RSiO_{1.5})_m(R'SiO_{1.5})_n(RXSiO_{1.0})_p]_{\sum\#}$, where R and R' each represents an organic substituent, X represents ~~an inorganic~~ functionality substituent, m, n and p represent the stoichiometry of the ~~composition~~formula, $\sum$ indicates nanostructure, and # represents the number of silicon atoms contained within the nanostructure.

38. (Amended) The process of claim 37, further comprising the step of purifying the isolated POSS nanostructure compound through ~~exhaustive~~ washing with water.

44. (Amended) The process of claim 33, further ~~comprises~~comprising mixing a co-reagent with the base and the mixture of different homoleptic POSS nanostructure compounds in the solvent.

46. (Amended) A process of converting a plurality of POSS fragments into a POSS compound, comprising:

mixing an effective amount of a base with the plurality of POSS fragments in a solvent to produce a basic reaction mixture, the base reacting with the POSS fragments to produce the POSS compound,

wherein the POSS fragments have the formula $(RSiO_{1.5})_m(RXSiO_{1.0})_n$, and the POSS compound is selected from the group consisting of homoleptic nanostructure compounds having the formula $[(R\text{-}XSiO_{1.5})_n]_{\sum\#}$, heteroleptic nanostructure compounds having the

formula $[(RSiO_{1.5})_m(R'SiO_{1.5})_n]_{\sum\#}$, functionalized homoleptic nanostructure compounds having the formula $[(RSiO_{1.5})_m(RXSiO_{1.0})_n]_{\sum\#}$, functionalized heteroleptic nanostructure compounds having the formula $[(RSiO_{1.5})_m(R'SiO_{1.5})_n(RXSiO_{1.0})_p]_{\sum\#}$, and expanded POSS fragments having the formula $(RSiO_{1.5})_m(RXSiO_{1.0})_n$, where R and R' each represents an organic substituent, X represents ~~an inorganic~~ functionality substituent, m, n and p represent the stoichiometry of the ~~composition~~formula, $\sum$ indicates nanostructure, and # represents the number of silicon atoms contained within the nanostructure.

51. (Amended) The process of claim 50, further comprising the step of purifying the isolated POSS compound through ~~exhaustive~~washing with water.

57. (Amended) The process of claim 46, further ~~comprises~~comprising mixing a co-reagent with the base and the ~~polymeric silsesquioxane~~plurality of POSS fragments in the solvent.

59. (Amended) A process of converting a first functionalized POSS nanostructure compound into a second functionalized POSS nanostructure compound that is different than the first functionalized POSS nanostructure compound, comprising:

mixing an effective amount of a base with the first functionalized POSS nanostructure compound in a solvent to produce a basic reaction mixture, the base reacting with the first functionalized POSS nanostructure compound to produce the second POSS nanostructure compound,

wherein the first and second POSS nanostructure compounds are each selected from the group consisting of homoleptic nanostructure compounds having the formula $[(R\text{~~X~~}SiO_{1.5})_n]_{\sum\#}$, heteroleptic nanostructure compounds having the formula $[(RSiO_{1.5})_m(R'SiO_{1.5})_n]_{\sum\#}$, functionalized homoleptic nanostructure compounds having the formula $[(RSiO_{1.5})_m(RXSiO_{1.0})_n]_{\sum\#}$, and functionalized heteroleptic nanostructure compounds having the formula $[(RSiO_{1.5})_m(R'SiO_{1.5})_n(RXSiO_{1.0})_p]_{\sum\#}$, where R and R' each represents an organic substituent, X represents ~~an inorganic~~ functionality substituent, m, n and p

represent the stoichiometry of the ~~composition~~formula, $\sum$ indicates nanostructure, and # represents the number of silicon atoms contained within the nanostructure.

65. (Amended) The process of claim 64, further comprising the step of purifying the isolated POSS nanostructure compound through ~~exhaustive~~washing with water.

71. (Amended) The process of claim 59, further ~~comprises~~comprising mixing a co-reagent with the base and the ~~polymeric silsesquioxane~~first functionalized POSS nanostructure compound in the solvent.

73. (Amended) A process of converting a POSS fragment and a first POSS nanostructure compound into an expanded second POSS nanostructure compound having a number of silicon Si atoms equal to the combined number of silicon atoms present in the POSS fragment and in the first POSS nanostructure compound, comprising:

mixing an effective amount of a base with the POSS fragment and the first POSS nanostructure compound in a solvent to produce a basic reaction mixture, the base reacting with the POSS fragment and the first POSS nanostructure compound to produce the expanded second POSS nanostructure compound,

wherein the POSS fragment has the formula $(RSiO_{1.5})_m(RXSiO_{1.0})_n$, and the first and second POSS nanostructure compounds are each selected from the group consisting of: homoleptic nanostructure compounds having the formula $[(RXSiO_{1.5})_n]_{\sum\#}$, heteroleptic nanostructure compounds having the formula $[(RSiO_{1.5})_m(R'SiO_{1.5})_n]_{\sum\#}$, functionalized homoleptic nanostructure compounds having the formula $[(RSiO_{1.5})_m(RXSiO_{1.0})_n]_{\sum\#}$, functionalized heteroleptic nanostructure compounds having the formula $[(RSiO_{1.5})_m(R'SiO_{1.5})_n(RXSiO_{1.0})_p]_{\sum\#}$, and silicate nanostructure compounds having the formula $[(XSiO_{1.5})_n]_{\sum\#}$, where R and R' each represents an organic substituent, X represents ~~an inorganic~~ functionality substituent, m, n and p represent the stoichiometry of the ~~composition~~formula, $\sum$ indicates nanostructure, and # represents the number of silicon atoms contained within the nanostructure.

78. (Amended) The process of claim 77, further comprising the step of purifying the isolated POSS nanostructure compound through ~~exhaustive~~ washing with water.

84. (Amended) The process of claim 73, further ~~comprises~~comprising mixing a co-reagent with the base and the ~~polymeric silsesquioxane~~POSS fragment and the first POSS nanostructure compound in the solvent.

86. (Amended) A process of converting an unfunctionalized POSS nanostructure compound into a functionalized POSS nanostructure compound, comprising:

mixing an effective amount of a base with the unfunctionalized POSS nanostructure compound in a solvent to produce a basic reaction mixture, the base reacting with the unfunctionalized POSS nanostructure compound to produce the functionalized POSS nanostructure compound,

wherein the unfunctionalized POSS nanostructure compound is selected from the group consisting of homoleptic nanostructure compounds having the formula $[(RXSiO_{1.5})]_{\sum\#}$ and heteroleptic nanostructure compounds having the formula $[(RSiO_{1.5})_m(R'SiO_{1.5})_n]_{\sum\#}$, and the functionalized POSS nanostructure compound is selected from the group consisting of functionalized homoleptic nanostructure compounds having the formula $[(RSiO_{1.5})_m(RXSiO_{1.0})_n]_{\sum\#}$ and functionalized heteroleptic nanostructure compounds having the formula $[(RSiO_{1.5})_m(R'SiO_{1.5})_n(RXSiO_{1.0})_p]_{\sum\#}$, where R and R' each represents an organic substituent, X represents ~~an inorganic~~ functionality substituent, m, n and p represent the stoichiometry of the ~~composition~~formula, $\sum$ indicates nanostructure, and # represents the number of silicon atoms contained within the nanostructure.

91. (Amended) The process of claim 90, further comprising the step of purifying the isolated functionalized POSS nanostructure compound through ~~exhaustive~~ washing with water.

97. (Amended) The process of claim 86, further ~~comprises~~comprising mixing a co-reagent with the base and the polymeric silsesquioxane in the solvent.

99. (Amended) A process of rearranging the structure of a compound selected from the group consisting of POSS fragments having the formula $[(RSiO_{1.5})_m(RXSiO_{1.0})_n]$, silicate nanostructure compounds having the formula $[(XSiO_{1.5})_n]_{\sum\#}$, homoleptic nanostructure compounds having the formula $[(RXSiO_{1.5})_n]_{\sum\#}$, heteroleptic nanostructure compounds having the formula $[(RSiO_{1.5})_m(R'SiO_{1.5})_n]_{\sum\#}$, functionalized homoleptic nanostructure compounds having the formula $[(RSiO_{1.5})_m(RXSiO_{1.0})_n]_{\sum\#}$, and functionalized heteroleptic nanostructure compounds having the formula $[(RSiO_{1.5})_m(R'SiO_{1.5})_n(RXSiO_{1.0})_p]_{\sum\#}$, the process comprising:

mixing an effective amount of a base with the compound in a solvent to produce a basic reaction mixture,

where R and R' each represents an organic substituent, X represents ~~an inorganic~~ functionality substituent, m, n and p represent the stoichiometry of the~~composition~~formula, $\sum$ indicates nanostructure, and # represents the number of silicon atoms contained within the nanostructure.

112. (Amended) The process of claim 99, further ~~compromises~~comprising mixing a co-reagent with the base and the ~~polymeric silsesquioxane~~compound in the solvent.

115. (Amended) The process of claim 46, wherein the POSS compound is $[~~108~~RSiO_{1.5})_4(RXSiO_{1.0})_3]_{\sum 7}$.

120. (Amended) A compound comprising a member of the group consisting of homoleptic nanostructure compounds having the formula $[(RXSiO_{1.5})_n]_{\sum\#}$, heteroleptic nanostructure

compounds having the formula $[(RSiO_{1.5})_m(R'SiO_{1.5})_n]_{\sum\#}$, functionalized homoleptic nanostructure compounds having the formula $[(RSiO_{1.5})_m(RXSiO_{1.0})_n]_{\sum\#}$, and functionalized heteroleptic nanostructure compounds having the formula $[(RSiO_{1.5})_m(R'SiO_{1.5})_n(RXSiO_{1.0})_p]_{\sum\#}$, where R and R' each represents an organic substituent, X represents ~~an inorganic~~ functionality substituent, ∞ represents the degree of polymerization and is a number greater than or equal to 1, m, n and p represent the stoichiometry of the ~~composition~~formula, ∑ indicates nanostructure, and # represents the number of silicon atoms contained within the nanostructure~~, wherein the compound is produced by the process of claim 8~~.

~~121. A compound as recited in claim 120, wherein the compound is $[(RSiO_{1.5})_4(RXSiO_{1.0})_3]_{\sum 7}$.~~

122. (Amended) A compound ~~produced by the process of daim 22, the compound~~ having the formula $[RSiO_{1.5})_m(RXSiO_{1.0})_n]$, where R represents an organic substituent, X represents ~~an inorganic~~ functionality substituent, and m and n represent the stoichiometry of the ~~composition~~formula

~~123. A compound comprising a member of the group consisting of nonfunctionalized heteroleptic nanostructure compounds having the formula $[(RSiO_{1.5})_m(R'SiO_{1.5})_n]_{\sum\#}$ and functionalized heteroleptic nanostructure compounds having the formula $[(RSiO_{1.5})_m(R'SiO_{1.5})_n(RXSiO_{1.0})p]_{\sum\#}$, where R and R' each represents an organic substituent, X represents an inorganic substituent, m, n and p represent the stoichiometry of the composition, ∑ indicates nanostructure, and # represents the number of silicon atoms contained within the nanostructure, wherein the compound is produced by the process of claim 33.~~

~~124. A compound comprising a member of the group consisting of homolepti~~ ~~nanostructure compounds having the formula $[(RXSiO_{1.5})_n]_{\sum\#}$, heteroleptic nanostructure~~

~~compounds having the formula $[(RSiO_{1.5})_m(R'SiO_{1.5})_n]_{\sum\#}$, functionalized homoleptic nanostructure compounds having the formula $[(RSiO_{1.5})_m(RXSiO_{1.0})_n]_{\sum\#}$, functionalized heteroleptic nanostructure compounds having the formula $[(RSiO_{1.5})_m(R'SiO_{1.5})_n(RXSiO_{1.0})p]_{\sum\#}$, and expanded POSS fragments having the formula $(RSiO_{1.5})_m(RXSiO_{1.0})_n$, where R and R' each respresents an organic substituent, X represents an inorganic substituent, m, n and p represent the stoichiometry of the composition, $\sum$ indicates nanostructure, and # represents the number of silicon atoms contained within the nanostructure, wherein the compound is produced by the process of claim 46~~.

~~125. A compound as recited in claim 124, wherein the compound is $[(RSiO_{1.5})_4(RXSiO_{1.0})_3]_{\Sigma 7}$.~~

~~126. A compound comprising a member of the group consisting of homoleptic nanostructure compounds having the formula $[(RXSiO_{1.5})_n]_{\sum\#}$, heteroleptic nanostructure compounds having the formula $[(RSiO_{1.5})_m(R'SiO_{1.5})_n]_{\sum\#}$, functionalized homoleptic nanostructure compounds having the formula $[(RSiO_{1.5})_m(RXSiO_{1.0})_n]_{\sum\#}$, and functionalized heteroleptic nanostructure compounds having the formula $[(RSiO_{1.5})_m(R'SiO_{1.5})_n(RXSiO_{1.0})p]_{\sum\#}$, where R and R' each represents an organic substituent, X represents an inorganic substituent, m, n and p represent the stoichiometry of the composition, $\sum$ indicates nanostructure, and # represents the number of silicon atoms contained within the nanostructure, wherein the compound is produced by the process of claim 59.~~

~~127. A compound as recited in claim 126, wherein the compound is $[(RSiO_{1.5})_4(RXSiO_{1.0})_3]_{\Sigma 7}$.~~

128. (Amended) A compound ~~comprising a member of the group consisting of homoleptic nanostructure compounds having the formula $[(RXSiO_{1.5})_n]_{\sum\#}$, heteroleptic nanostructure~~

~~compounds having the formula $[(RSiO_{1.5})_m(R'SiO_{1.5})_n]_{\Sigma\#}$ functionalized homoleptic nanostructure compounds having the formula $[(RSiO_{1.5})_m(RXSiO_{1.0})_n]_{\Sigma\#}$, functionalized heteroleptic nanostructure compounds having the formula $[(RSiO_{1.5})_m(R'SiO_{1.5})_n(RXSiO_{1.0})p]_{\Sigma\#}$, and silicate nanostructure compounds~~ having the formula $[(XSiO_{1.5})_n]_{\sum\#}$, where ~~R and R' each represents an organic substituent,~~ X represents ~~an inorganic~~ functionality substituent, ~~m~~, n ~~and~~p represents the stoichiometry of the ~~composition~~formula, $\sum$ indicates nanostructure, and # represents the number of silicon atoms contained within the nanostructure~~, wherein the compound is produced by the process of claim 73~~.

~~129. A compound as recited in claim 128, wherein the compound is $[(RSiO_{1.5})_4(RXSiO_{1.0})_3]_{\Sigma7}$.~~

~~130. A compound comprising a member of the group consisting of functionalized POSS nanostructure compound is selected from the group consisting of functionalized homoleptic nanostructure compounds having the formula $[(RSiO_{1.5})_m(RXSiO_{1.0})_n]_{\sum\#}$ and functionalized heteroleptic nanostructure compounds having the formula $[(RSiO_{1.5})_m(R'SiO_{1.5})_n(RXSiO_{1.0})p]_{\sum\#}$, where R and R' each represents an organic substituent, X represents an inorganic substituent, m, n and p represent the stoichiometry of the composition, $\sum$ indicates nanostructure, and # represents the number of silicon atoms contained within the nanostructure, wherein the compound is produced by the process of claim 86.~~

~~131. A compound as recited in claim 130, wherein the compound is $[(RSiO_{1.5})_4(RXSiO_{1.0})_3]_{\Sigma7}$.~~

~~132. A compound produced by the process of claim 99~~.

~~133. A compound as recited in claim 132, wherein the compound is $[(RSiO_{1.5})_4(RXSiO_{1.0})_3]$ Σ7.~~

134. (New) The process of claim 99, wherein the structure of the compound is rearranged so that the compound is converted into an isomer of the same compound.